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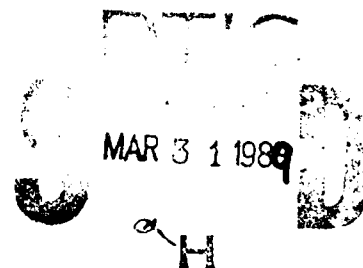
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**ASSESSMENT OF HABITUAL DINERS
NUTRIENT INTAKE IN A MILITARY-OPERATED
GARRISON DINING FACILITY
FT DEVENS I**

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**U S ARMY RESEARCH INSTITUTE
OF
ENVIRONMENTAL MEDICINE
Natick, Massachusetts**

NOVEMBER 1988



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**UNITED STATES ARMY
MEDICAL RESEARCH & DEVELOPMENT COMMAND**

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FT DEVENS I

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DISCLAIMER STATEMENT

The views, opinions, and findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

Human Subjects participated in these studies after giving their free and informed voluntary consent. Investigators adhered to AR 70-25 and USAMRDC Regulation 70-25 on Use of Volunteers in Research.

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ABSTRACT

In response to a tasking from the Office of the Deputy Chief of Staff for Logistics (ODCSLOG) the U.S. Army Research Institute of Environmental Medicine (USARIEM) has completed the third in a continuing series of nutrition assessments of soldiers subsisting in military dining facilities. The purpose of these studies is to evaluate the impact of nutrition initiatives planned to moderate soldiers' sodium, fat and cholesterol intakes and to provide soldiers with low calorie menu selections. In August 1987, the third nutrition assessment was completed using 54 male soldier volunteers from Ft. Devens, Massachusetts, subsisting in Consolidated Dining Facility #2. Nutrient intakes were assessed by comparing average daily nutrient intakes, expressed as group means, with the Office of the Surgeon General (OTSG) Military Recommended Dietary Allowances (MRDA AR 40-25).

Nutrient intakes of the Ft. Devens test subjects met or exceeded the MRDA for energy, protein, vitamins, and minerals. Average sodium intakes for the test subjects of 1674 milligrams per 1000 kcals were within the OTSG guidelines of 1400-1700 mg sodium per 1000 kcals. Approximately 10% of total sodium was obtained from salt added by the test subjects. Test subjects' fat intakes, 38.2% of total calories, were approximately three percent higher than what was reported for similarly aged males in the 1985 Nationwide Food Consumption Survey, and exceeded the target level maximum of 35% of total calories. Average daily cholesterol intakes, 677 milligrams, exceeded the level recommended by the American Heart Association and National Cholesterol Education Program of less than 300 mg per day. A military standard for cholesterol has yet to be established. Fifty to sixty percent of total daily cholesterol was obtained at breakfast meals with egg entrees contributing 70-80% of breakfast cholesterol and 50-60% of total daily cholesterol.

Despite distinct differences in the three dining facilities and test populations studied, nutrient intakes of the Ft. Devens test subjects were remarkably similar to

nutrient intakes of test subjects from the two previous dining facilities studied. Nutrition initiatives appear to be working, however an effort needs to be made to determine why the AR 40-25 goal of 35% of calories for fat intake has not been achieved. The feasibility and effectiveness of using low cholesterol, low fat alternatives to eggs to moderate cholesterol and fat intakes should also be evaluated. Soldiers' eating habits outside of military dining facilities need to be assessed. Nutrition initiatives designed to provide nutrition education to soldiers in Basic Training and in other training should be continued, however emphasis should be placed on tailoring and standardizing nutrition education curricula to meet the needs of diverse military subpopulations.

INTRODUCTION

Background and Military Relevance

Physical Fitness was the Army's theme for the year 1982. Emphasis was placed on physical fitness because of its direct impact on combat readiness. Physical fitness is one component of total fitness. Total fitness includes: weight control, diet and nutrition, abstinence from tobacco products, smoking cessation, avoidance of substance abuse, and stress management. A renewed interest in physical fitness in the Army paralleled interest in the civilian community which was also becoming increasingly health oriented and nutrition conscious. In support of total fitness and health promotion, the Vice Chief of Staff of the Army tasked ODCSLOG and OTSG to plan nutrition initiatives that would heighten soldiers' awareness of the importance of nutrition, educate soldiers to make appropriate food choices, and provide a variety of nutritious menu alternatives to soldiers subsisting in garrison dining facilities. In October 1985, ODCSLOG sponsored a *MACOM Worldwide Nutrition Conference* during which participants identified the need to evaluate the effectiveness of the nutrition initiatives that have been implemented in Army Dining Facilities.

ODCSLOG tasked the Medical Research and Development Command to conduct a series of evaluations and U.S. Army Forces Command (FORSCOM) and U.S. Army Training and Doctrine Command (TRADOC) to provide the test units (1). The Military Nutrition Division, USARIEM, was responsible for completing the nutrition evaluations. To assess nutrition awareness and attitudes of soldiers and food service personnel USARIEM requested participation from Behavioral Sciences Division, Science and Advanced Technology Directorate, U.S. Army Natick Research, Development and Engineering Center (NRDEC), of Natick, Massachusetts.

Nutrition assessments of three garrison dining facilities have been completed. In July-August 1986, a study was completed at the contractor-operated NCO Academy Dining Facility at Ft. Riley, Kansas. In November 1986, a study was completed at

the military-operated 80th Ordnance Battalion Dining Facility at Ft. Lewis, Washington. In August 1987, a third study was completed at Consolidated Dining Facility #2 (CDF #2), which serves the soldiers of the 39th Engineer Battalion Combat and 10th Special Forces Group (Airborne) of Ft. Devens, Massachusetts. The results of the Ft. Riley dining facility study and a comparison of the Ft. Riley and Ft. Lewis Dining Facilities are published in separate USARIEM technical reports (1.2). Each of these studies was planned to determine the impact of nutrition initiatives on soldiers nutrient intakes, however there were other issues of concern. Budget cuts have resulted in contracting many Army Dining Facility operations, consequently ODCSLOG is interested in determining if contractor-operated dining facilities are meeting the nutritional requirements of soldiers subsisting in these facilities. The Ft. Riley test subjects who were attending the Primary Leadership Development Course (PLDC) at the NCO Academy were a "captive" audience. Attendance at meals in the dining facility was mandatory. Time for meals was part of the daily class schedule. The Ft. Lewis dining facility selected for study was military-operated and supported a TO&E unit. Since soldiers are not required to subsist in the dining facility, their meal participation rates were of interest. Participation at meals was at the discretion of the Ft. Lewis test subjects, thus allowing determination of the percentage of soldiers who eat in the dining facility. The Ft. Devens study was planned to be a two part passive nutrition intervention study since the previous studies indicated soldiers' intakes of cholesterol are of concern. At Ft. Devens a special effort was made to identify soldiers who usually ate the majority of their meals in the dining facility; these soldiers were invited to participate in the study.

METHOD

Test Facility

Consolidated Dining Facility #2 is a military-operated dining facility which feeds approximately 300 soldiers per meal. The Food Service Sergeant is required to meet Army Regulation 30-1 (6) requirements and to use the Master Menu for menu planning. A copy of the menu used during the Ft. Devens study can be found in Appendix A. CDF #2 was 1st runner-up (First Army) in the annual Connelly Award competition for excellence in Army Food Service.

Nutrition Initiatives

The Ft. Devens Food Service Advisor was asked to provide information regarding implementation of the nutrition initiatives in place during the time frame of the study (Appendix B).

Selection and Recruitment of Test Subjects

At Ft. Devens a special effort was made to identify soldiers who usually ate the majority of their meals in the dining facility. DA Form 3032 (Headcount Sheet) was reviewed for 14 week days. Meal card numbers were keypunched and a frequency distribution was computer generated. A list of the most frequently appearing meal card numbers was provided to Ft. Devens Personnel Actions Center (PAC). A list of names to match the meal card numbers was provided by PAC. The list of names was used to recruit test subjects for the Ft. Devens dining facility study.

Soldiers who volunteered to participate in this study attended a briefing on the purpose of the study. After being given an opportunity to ask questions, the volunteers signed a Volunteer Agreement in accordance with the approved Human Use protocol. Demographic questionnaires (Appendix C) which included information about usual eating habits were administered to the volunteers. Height and weight data and

Army Physical Fitness Training (APFT) Test Card scores were obtained. Ninety-six percent of the test subjects were in compliance with AR 600-9 standards (7). Information obtained and compiled from the test subjects' Army Physical Readiness Test Scorecard, DA form 705 (8), revealed a mean score of 227 points. Mean height for the test subjects was 68 inches; mean weight was 170 pounds.

The Ft. Devens dining facility study results are based on food intake data collected from 54 male soldiers who attended the majority of their meals in the dining facility. Attendance at meals was encouraged. Data were aggregated for test subjects. Data on food intake outside the dining facility was collected via 24-hour written recalls from the test subjects. The analysis of food intake outside of the dining facility will be included in a forthcoming USARIEM technical report.

Food Intake Data

Data collectors were trained to visually estimate portion sizes at USARIEM prior to the study. Data collectors practiced estimating portion sizes by comparing various portion sizes to a reference standard plate which contained a weighed standard portion of each food item. Each plate contained fractional portions of the reference standard plate. Feedback was provided to the data collectors on how accurately they were estimating portion sizes. After estimating portions as served, data collectors estimated portions on trays arranged to represent unconsumed food. Data collectors evaluated the same trays independently and their results were compared to the actual portion weights to determine accuracy. Prior to data collection at Ft. Devens, data collectors performed a practice run. The purpose of the practice run was to provide data collectors experience with foods served in the dining facility and practice estimating self-service items. This method has been used and validated in previous USARIEM studies (1,2,3.).

In CDF #2, a portion of each food served at every meal was obtained and weighed. These weighed portions of foods were used as reference standards by the data collectors to visually estimate portions served and returned by the test subjects. Portions were estimated to the nearest 0.1 of a portion. Copies of the data collection forms used during the Ft. Devens dining facility study are in Appendix D. Before each meal, data collectors gave each of their assigned test subjects a weighed and labeled salt shaker. After the meal, salt shakers were returned to data collectors, who then weighed them to determine the amount of salt used by the test subjects. Individual assignment of salt shakers, in lieu of salt packets and the common salt shakers provided on the tables, resulted in a precise estimation of the amount of salt added by test subjects.

Limitations

Samples of the foods served during the Ft. Devens dining facility study were not obtained for chemical analysis. Computerized nutrient composition data bases provided the nutritional analysis for the foods served. Intakes of vitamin B₆, folic acid, magnesium, and zinc were not included since food composition data for these nutrients were incomplete and conclusions could be misleading. Although there are MRDA for vitamin D, vitamin E, and iodine, lack of food composition data again precluded evaluation of the adequacy of these nutrients. Baseline data were not collected prior to implementation of nutrition initiatives which makes it difficult to fully assess the influence of nutrition education and menu modifications on soldiers eating habits.

Computer support limitations precluded handling the subjects' missing data by subject as is desirable, therefore all data were computed by meal and by day to obtain day means and study means as described later in this report.

Nutrient Composition Data Base

The Massachusetts Nutrient Databank (MNDB) at the University of Massachusetts, Amherst, was the database used for all nutrient composition data derived for the foods served in CDF #2. Recipe specialists observed food preparation at each meal and recorded deviations from the standard procedures prescribed in the Tri-Service Recipe File TM 10-412. These recipe specialists paid careful attention to fat and sodium containing ingredients which were weighed or measured when possible. All multiple ingredient recipes were coded and computer analyzed by the MNDB. Nutrient information was compiled to provide nutrient data on a per serving and 100 gram basis.

RESULTS

Demographics

Tabulation of the answers supplied by test subjects on the demographics questionnaire revealed a mean age of 21 years with approximately two years and two months in service. Rank structure for the test subjects was as follows: 2% E-6, 7% E-5, 43% E-4, 24% E-3, 22% E-2 and 2% E-1. Distribution by racial category was: 65% White, 22% Black, 13% Hispanic, and 0% Other. Thirty-seven percent of test subjects indicated that they usually (6 to 7 days per week) eat breakfast in the dining facility. Thirty-nine percent indicated that they usually eat lunch in the dining facility. Thirty-nine percent indicated that they usually eat dinner in the dining facility. Sixty-seven percent answered that they add salt to their food at the table and 4% indicated that they use the herbal seasoning shakers found on the tables in the dining facility. Thirty-three percent indicated that they wanted to lose weight with a mean desired loss of 11 pounds. Nineteen percent indicated that they wanted to gain weight with a mean desired gain of 17 pounds. Use of nutritional supplements, i.e., vitamins, minerals, or protein powder, was acknowledged by 15% of test subjects queried. Fifty-three percent answered that they had completed high school. Forty-four percent had technical training and/or varying amounts of college experience. Four percent indicated that they had not completed high school. Thirty-three percent of test subjects claimed to smoke cigarettes and 10% chew tobacco.

Nutrient Intake

Study means represent group averages. Group average nutrient intakes were calculated by meal and by day. Each subject's nutrient intake was calculated by meal and then averaged by dividing by the total number of subjects who were present at the meal. In other words data were averaged using the number of subjects present at each meal. Average daily nutrient intakes (breakfast, lunch and dinner means)

were summed and then divided by the 7 days of the study to obtain the study mean nutrient intake. Although participation rates were high (>90%), not every subject attended every meal. Average nutrient intakes were compared with the MRDA. Comparison of nutrient intakes, expressed as a mean for each nutrient, with MRDA levels is presented in Table 1. Table 2 provides information by meal and by day on subjects' average energy intakes.

Analysis of the food intake data collected at Ft. Devens revealed that nutrient intakes either met or exceeded AR 40-25 allowances. Energy intakes were 2978 kcal per day and were within the 2800-3600 kcal per day MRDA range for moderately active males. Mean daily protein intakes of the test subjects were 111 grams, exceeding the MRDA of 100 grams per day. Fat intakes averaged 126 grams per day. Fat consumed by the test subjects contributed 38.2% of the total calories. AR 40-25 specifies that not more than 35% of total calories should be provided as fat. Fat intakes will be discussed in greater detail later in this report.

The MRDA for carbohydrate is also expressed as a percent of total calories. Although carbohydrate is not included in the table of nutrients with specific MRDA in AR 40-25, the text provides a guideline of 50-55% of total calories to be supplied by carbohydrate. Following this guideline, soldiers consuming 2800-3600 calories should consume 350-495 grams of carbohydrate per day. Average daily intakes of 356 grams met the MRDA guidelines.

Vitamin and mineral intakes, including sodium, met or exceeded the MRDA guidelines. Figures 1 and 2 provide a comparison of vitamin and mineral intakes of the Ft. Devens test subjects compared to the Ft. Riley and Ft. Lewis test subjects. Sodium intake is not included on the graph of mineral intakes, as it will be discussed separately in more detail. Data were collected on foods consumed outside the dining facility. The analysis of that data is not included in this report.

Table 1

Comparing Average Daily Intakes of Selected
Nutrients with AR 40-25 MRDA

<u>Nutrient</u>	<u>Ft. Devens I</u>	<u>AR 40-25</u>
Energy (Kcal)	2978	2800-3600
Protein (gm)	111	100
Vitamin A (mcg RE)	1680	1000
Ascorbic Acid (mg)	184	60
Thiamin (mg)	2.2	1.6
Riboflavin (mg)	2.5	1.9
Niacin (mg)	28.7	21
Vitamin B ₁₂ (mcg)	6.5	3.0
Calcium (mg)	1236	800-1200
Phosphorus (mg)	1879	800-1200
Iron (mg)	16.8	10-18

AVERAGE CALORIC INTAKE BY MEAL, BY DAY AND NUMBER OF SUBJECTS

Table 2

STUDY DAYS	1	2	3	4	5	6	7	SUM OF MEAL MEANS OVER 7 DAYS
BREAKFAST	N= 48 \bar{x} =1034 SD= 389	N= 53 \bar{x} = 963 SD= 365	N= 51 \bar{x} = 930 SD= 327	N= 54 \bar{x} = 934 SD= 366	N= 51 \bar{x} = 949 SD= 362	N= 52 \bar{x} = 933 SD= 331	N= 50 \bar{x} =1037 SD= 390	\bar{x} = 968 SD= 362
LUNCH	N= 52 \bar{x} =1107 SD= 386	N= 49 \bar{x} =1031 SD= 306	N= 49 \bar{x} = 958 SD= 336	N= 50 \bar{x} = 951 SD= 331	N= 50 \bar{x} = 928 SD= 265	N= 50 \bar{x} =1103 SD= 329	N= 48 \bar{x} =1032 SD= 312	\bar{x} =1015 SD= 325
DINNER	N= 47 \bar{x} =1040 SD= 293	N= 50 \bar{x} =1077 SD= 390	N= 42 \bar{x} =1039 SD= 403	N= 53 \bar{x} = 957 SD= 374	N= 54 \bar{x} = 883 SD= 316	N= 49 \bar{x} = 992 SD= 355	N= 50 \bar{x} =959 SD=298	\bar{x} = 992 SD= 349
DAY TOTALS (SUM OF B L D)	3181	3071	2927	2842	2760	3028	3028	

\bar{x} =GROUP MEAN CALORIES N=NUMBER OF SUBJECTS SD=STANDARD DEVIATION

DISCUSSION

Assessment of Nutrient Intakes

Using group means to compare with MRDA values for selected nutrients, the meals consumed by the male test subjects in CDF #2 were nutritionally adequate. Test subjects consumed greater than 100% of the MRDA for protein, vitamins and minerals evaluated. The Ft. Devens data reaffirms that there is no need for vitamin and/or mineral supplementation for male soldiers eating regularly in garrison dining facilities. Soldiers are not required to eat their meals in Army dining facilities, consequently their nutritional status is influenced by the choices they make when they eat in other places. The nutritional adequacy of self-selected diets from outside of the dining facility, i.e., home, restaurants and fast food outlets, has not been determined from the data collected. Whether female soldiers eating regularly from the same menus would also meet all vitamin and/or mineral recommendations cannot be answered from these studies. These issues will have to be addressed in subsequent reports and future studies.

Evaluation of Selected Nutrition Initiatives

Nutrition initiatives have been implemented to decrease soldiers' sodium, fat, and cholesterol intakes, and to provide soldiers lower calorie menu selections. Food intake data were used to assess the effectiveness of the nutrition initiatives, however data were not collected prior to implementation of the nutrition initiatives which makes it difficult to assess the impact of the menu modifications and nutrition education on soldiers nutrient intakes (1.2).

Sodium

A 25% reduction in the amount of salt used in recipes was one of the first nutrition initiatives implemented. Initially ODCSLOG/OTSG distributed a message to decrease salt in recipes by 25%. Cooks were instructed to calculate a 25% salt reduction and adjust certain recipes as they were prepared. During the Ft. Riley study, the Change 1 version of TM 10-412 was used. The change 0 version of TM 10-412 was used at Ft. Lewis, which does not include a 25% salt reduction. The Ft. Lewis cooks claimed that the recipe cards of the Change 1 version of TM 10-412 which includes the 25% salt reduction were inadvertently lost.

At Ft. Devens the cooks were using the Change 2 version of TM 10-412. Posted on the walls of the kitchen in the Ft. Devens dining facility, were the guidelines to reduce the salt used in recipes by 25%. Monitoring of food preparation methods demonstrated that in general the cooks were using the recipe cards for food preparation and not reducing salt an additional 25% as posted, however the amount of salt individual cooks used varied greatly. Food intake data calculations reflect the amount of salt used by the cooks in recipe preparation.

The amount of salt that is ultimately used in a recipe is at the discretion of the cook. Guidance and changes in the amount of salt to be used in recipes can be ambiguous. Recent communication with recipe developers from Behavioral Sciences Division, Science and Advanced Technology Directorate, NRDEC, revealed that subsequent changes to TM 10-412 vary in salt reduction from 0-100%. In at least one case, salt had to be added to a recipe which was originally designed for canned corn. The recipe using frozen corn was too bland without adding salt.

Daily sodium intakes of the Ft. Devens test subjects averaged 4935 milligrams. Sodium intakes of Ft. Riley test subjects were higher and averaged 5668 milligrams. Ft. Lewis test subjects' sodium intakes of 5020 milligrams were more similar to Ft. Devens test subjects' sodium intakes as presented in Figure 3. The amount of

sodium contributed by food as served and the amount of sodium contributed by salt added by the test subjects is represented by the stacked bar graph as depicted in Figure 3. Salt added by the test subjects in the three studies contributed approximately 10% of the total sodium, which was considerably higher than what was found in a study of adolescents (1% of total sodium) (10). A qualitative method was used to determine the amount of salt used by the adolescents. The MRDA guideline for sodium intakes for garrison feeding has been established as a range of 1400-1700 milligrams sodium per 1000 kcal. Figure 4 compares test subjects' average sodium intakes in the dining facilities studied per 1000 kcal with the MRDA minimum and maximum levels as represented by the horizontal broken lines. The amount of sodium which test subjects obtained from food itself and the amount of sodium they obtained from salt added at the table is also depicted in Figure 4. Daily sodium intakes averaged 1674 milligrams per 1000 kcals at Ft. Devens, which was slightly higher than what was found at Ft. Lewis (1585 milligrams per 1000 kcals). The military-operated dining facilities of Ft. Devens and Ft. Lewis were within the MRDA range. At Ft. Riley sodium intakes per 1000 kcal were 1821 milligrams which exceeded the upper limit of MRDA guidelines by 7%.

Some controversy remains as to whether military sodium guidelines are set too high. The Recommended Dietary Allowance of the National Research Council estimates that adults consume 2300-6900 milligrams of sodium per day which is equivalent to 6 to 18 gm of salt (11). Salt (NaCl) is approximately 40% sodium. In a market basket survey, the Food and Drug Administration Total Diet Study, estimated the sodium intake of the average adult male (15-20 years old) to be 6,706 milligrams (292 mEq), or 17 gm salt, more than double the upper limits of the estimated safe and adequate daily dietary intake (12). Estimates based on market basket and similar techniques probably overestimate sodium intake, since they measure projected diets rather than foods actually consumed (10). Sodium intake tends to parallel caloric intake (12).

Fat

Menu, preparation and serving standards designed to decrease soldiers' fat intakes prescribed by Appendix J of AR 30-1 include: trimming excess fat from meat, offering non-fried entree alternatives, cooking vegetables and starches without added fat and using 2% low fat milk as the primary milk source. The MRDA for fat specifies that not more than 35% of total calories should be provided as fat. Figure 5 provides a comparison of the percentage of calories obtained from fat in the three dining facilities studied. Fat consumed by Ft. Devens test subjects contributed 38.2% of total calories which was slightly above the amounts obtained by Ft. Riley and Ft. Lewis test subjects of 37.5% and 37.4%, respectively.

The nutrition initiative to use two percent low fat milk as the main source of milk appears to have made the most significant impact on decreasing the amount of calories obtained from fat. Two percent low fat chocolate milk was also available at each meal. Skim milk was served only at breakfast at Ft. Devens and was not available at Ft. Riley. Skim milk was available at every meal at Ft. Lewis. Whole milk and buttermilk were not served in any of the dining facilities studied. In previous studies the impact of the low fat milk initiative was calculated (1,2). Low fat milk contains approximately 55% less cholesterol than whole milk.

Although baseline data using the same methodology was not collected prior to implementation of the nutrition initiatives in garrison dining facilities, it is interesting to compare data collected in past garrison dining facility studies. When Ft. Riley was studied in 1953 over 47% of calories were obtained from fat as depicted by figure 6. Fat intakes (41% of calories on weekdays) of cadets at West Point in 1979 (13) were similar to fat intakes reported in the 1980 Nationwide Food Consumption Survey (14). The percent of calories obtained from fat in the three most recent garrison dining facility studies were two to three percent higher than what was reported for similarly aged males in the 1985 Nationwide Food Consumption Survey (35%) (15).

Cholesterol

Serving margarine instead of butter, serving alternatives to eggs at breakfast meals and the breakfast fitness bar are examples of nutrition initiatives designed to decrease soldiers' cholesterol intakes. Breakfast alternatives to egg entrees such as yogurt and cereals were available daily. Despite nutrition initiatives planned to provide soldiers with low cholesterol alternatives to traditional high cholesterol breakfast selections, test subjects' average cholesterol intakes were 677 milligrams per day which is approximately 227 mg per 1000 kcals. Cholesterol intakes of the test subjects at Ft. Devens were lower than those of the Ft Riley (761 mg or 244 mg/1000 kcals) or Ft. Lewis (744 milligrams or 235 mg/1000 kcals) test subjects. Overall, 89% of test subjects selected egg entrees on a daily basis.

Figure 7 provides a comparison of average daily cholesterol intakes on a per meal basis. Stacked bar graphs depict the amount of cholesterol contributed by each meal. As shown in Figure 7, the breakfast meal supplied a greater amount of dietary cholesterol than did either the lunch or dinner meals. Eggs served at breakfast supplied the majority of the cholesterol as illustrated by the stacked bar graph at Figure 8. The stacked bars represent the amount of cholesterol contributed by eggs, cholesterol from other sources i.e., breakfast meats and pancakes, and cholesterol provided by french toast.

Although Appendix J of AR 30-1 specifies the use of margarine in place of butter, margarine was unavailable during the Ft. Devens study. Butter was purchased at surplus prices which were one half to one quarter the cost of margarine. Similarly, Appendix J specifies that meats are to be trimmed of visible fat but this rarely if ever occurred. Appendix J also specifies frying in polyunsaturated oil which was not consistently complied with in any of the garrison dining facilities studied.

SUMMARY

Test subjects subsisting in Consolidated Dining Facility #2 selected a nutritionally adequate diet which met or exceeded the MRDA for all nutrients evaluated. In comparing nutrient intake data from this study to the results of the two preceeding garrison dining facility studies the results were remarkably similar. Whether female soldiers eating regularly in garrison dining facilities would also meet all vitamin and/or mineral recommendations cannot be answered from these studies. Assessment of females nutrient intakes should be addressed in future studies.

Sodium intakes were within AR 40-25 guidelines. Salt used by the test subjects contributed approximately 10% of the total sodium. Fat intakes were three percent above the target level of 35% or less. Average cholesterol intakes were more than twice the levels recommended by The American Heart Association and National Cholesterol Education Program. Egg entrees at the breakfast meal were extremely popular with test subjects in all three garrison dining facilities and contributed to almost half of the total daily cholesterol. Fifty to sixty percent of total dietary cholesterol was obtained at the breakfast meal.

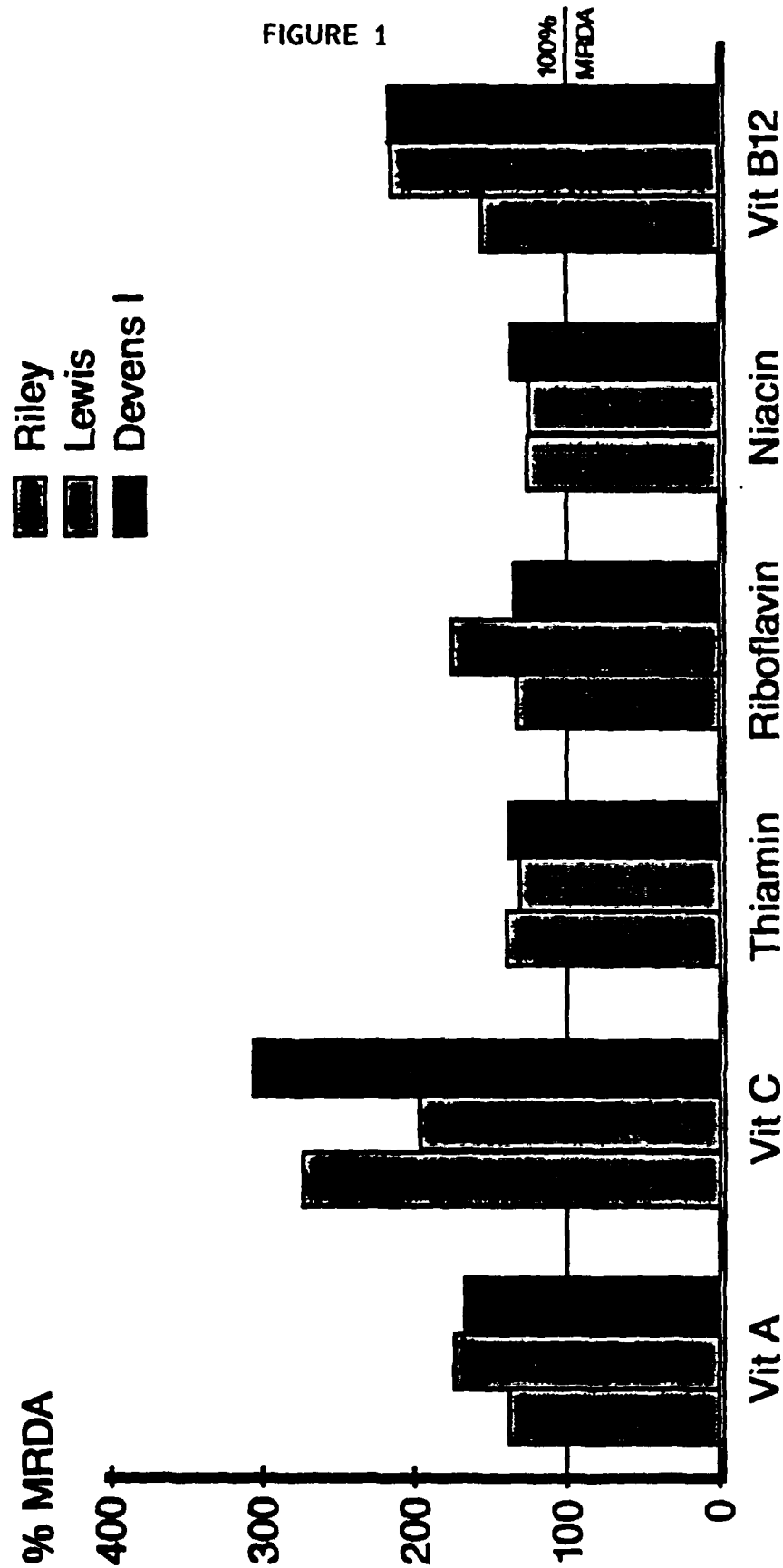
The results of this study are in agreement with the results of past garrison dining facility studies. Since Ft. Devens test subjects' cholesterol intakes were comparable to cholesterol intakes observed in Ft. Lewis and Ft. Riley test subjects: CDF #2 would be a suitable environment to test passive nutrition intervention to further reduce soldiers intakes of cholesterol. Additional effort is required to determine why the AR 40-25 goal for fat intakes has not been reached. Barriers and impediments to AR 30-1 Appendix J implementation need to be identified and resolved. Further work is needed to identify the major food sources of sodium, fat, and cholesterol selected by soldiers in garrison dining facilities. A joint effort by ODCSLOG and OTSG is needed to review military garrison dining facility study data and comparable civilian institutional feeding data, to determine if military sodium and

fat standards are prudent and establish a military standard for dietary cholesterol intake. Depending on the findings of this joint working group, AR 40-25 and AR 30-1 Appendix J should be revised to reflect the recommendations arising from the review of this data. In addition, consideration should be given to standardizing and tailoring nutrition education curricula to meet the needs of diverse military subpopulations.

RECOMMENDATIONS

1. Establish a Joint Working Group to review the results of the garrison dining facility studies and current nutrition standards. Recommendations of this group should be directed toward designing methods to meet AR 40-25 guidelines and satisfy nutrition initiative goals.
2. Identify major food sources of sodium, fat, and cholesterol selected by soldiers in garrison dining facilities and continue revision of Armed Forces Recipe Service (TM 10-412) recipes as indicated. Add more low fat, low cholesterol breakfast entrees.
3. Provide soldiers low cholesterol, low fat alternatives to eggs, and evaluate the acceptability and impact of using this approach to moderate soldiers' cholesterol intakes.
4. Continue nutrition education endeavors at all levels with emphasis on tailoring and standardizing curricula to meet the needs of diverse military subpopulations.
5. Assess nutrient intakes of soldiers in basic training and cadets at West Point including females. Data from the 1979 West Point nutrition assessment study exists which would permit an evaluation of progress in achieving nutrition initiatives over a 10 year time span.
6. Expand garrison dining facility nutrition research methodology to include monitoring blood lipids, and selected vitamins and mineral status, particularly iron status in females.

Average Daily Vitamin Intakes Compared with MRDA Values



Average Daily Mineral Intakes Compared with MRDA Values

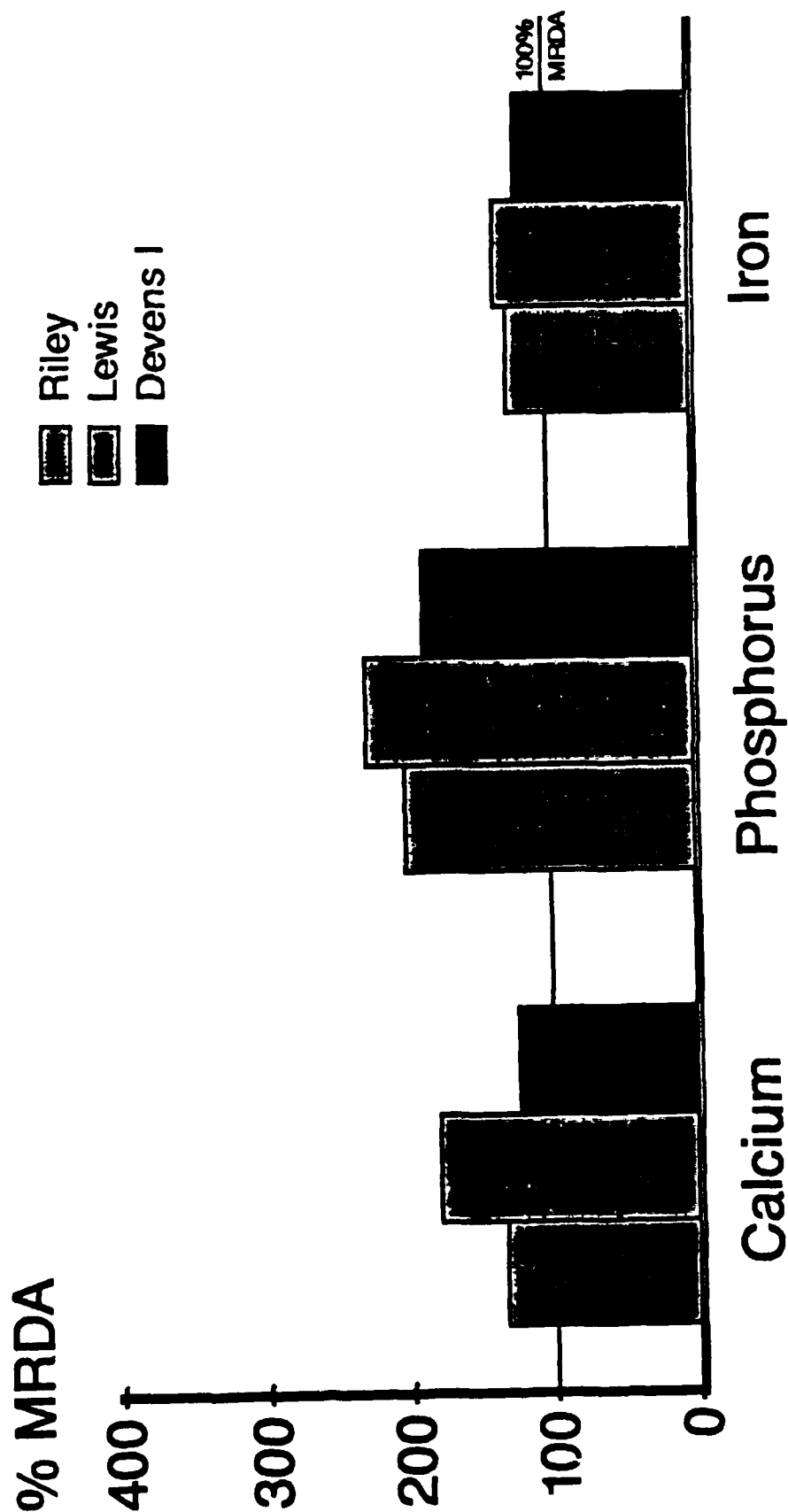


FIGURE 2

Comparison of Average Sodium Intakes

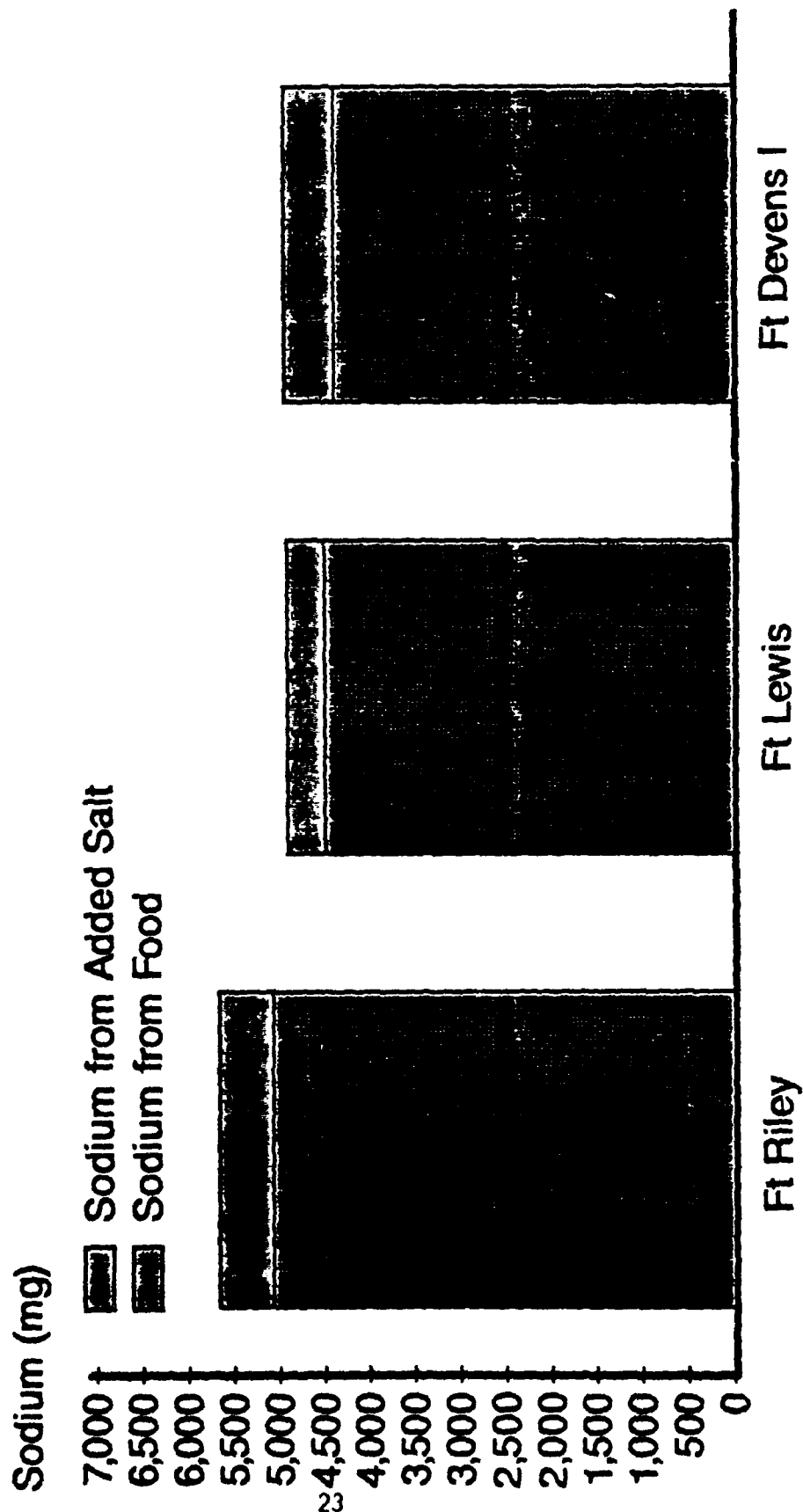


FIGURE 3

Comparison of Average Sodium Intakes Per 1000 Calories

Sodium (mg/1000 kcals)

 Sodium from Added Salt
 Sodium from Food

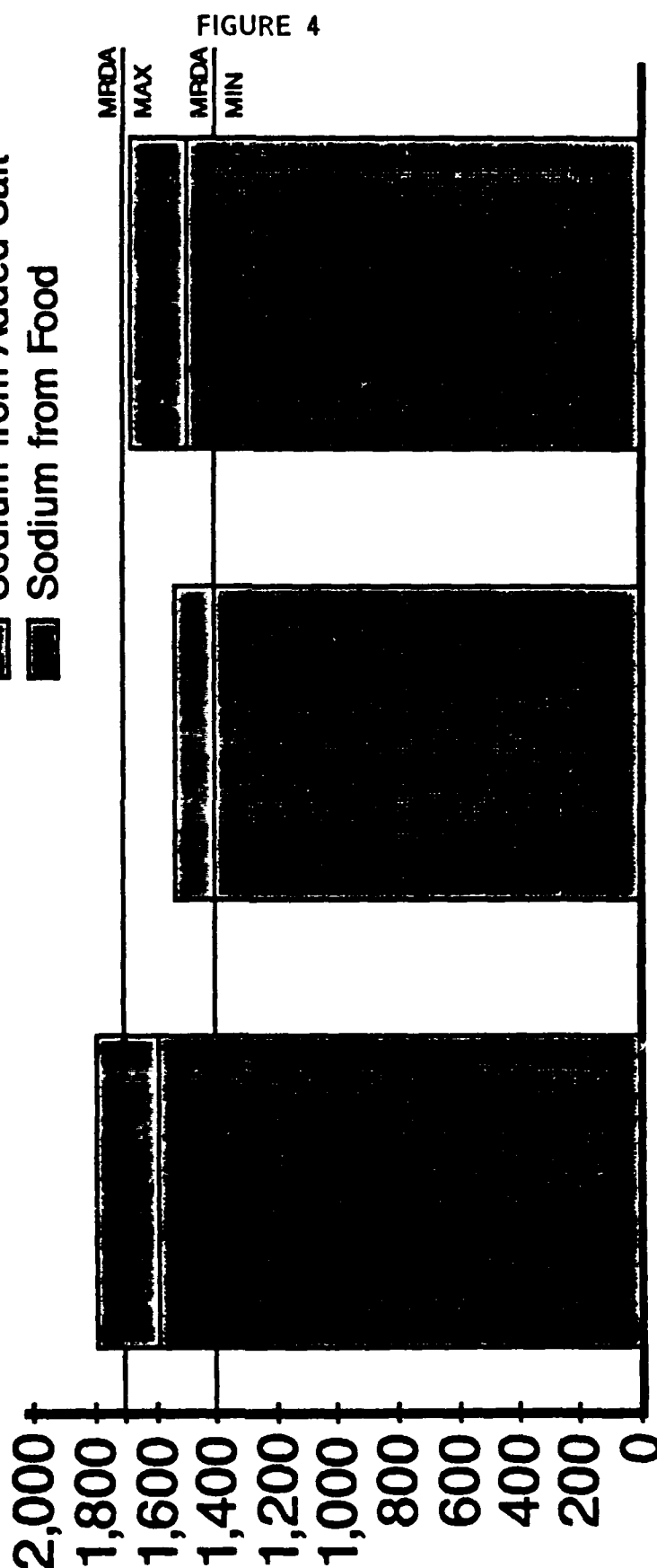


FIGURE 4

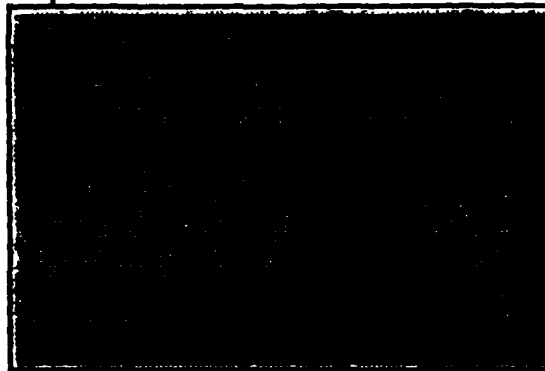
Percent of Calories From Fat

% of Calories

50
45
40
35
30
25
20
15
10
5
0

25

Recommended



Ft Devens I

Ft Lewis

Ft Riley

FIGURE 5

Trends in Army Dining Facilities Percent of Fat Calories

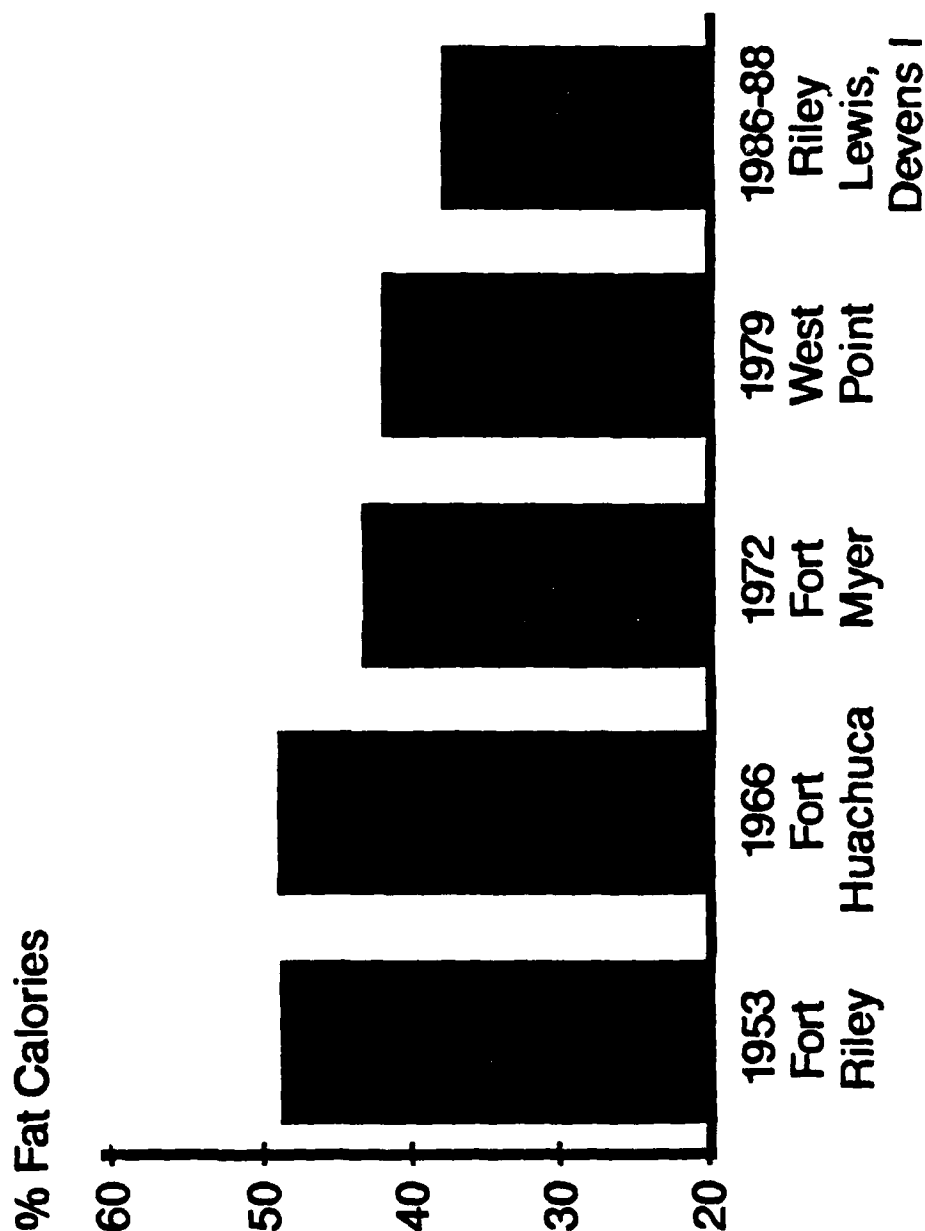


FIGURE 6

Comparison of Average Cholesterol Intakes On a Per Meal Basis

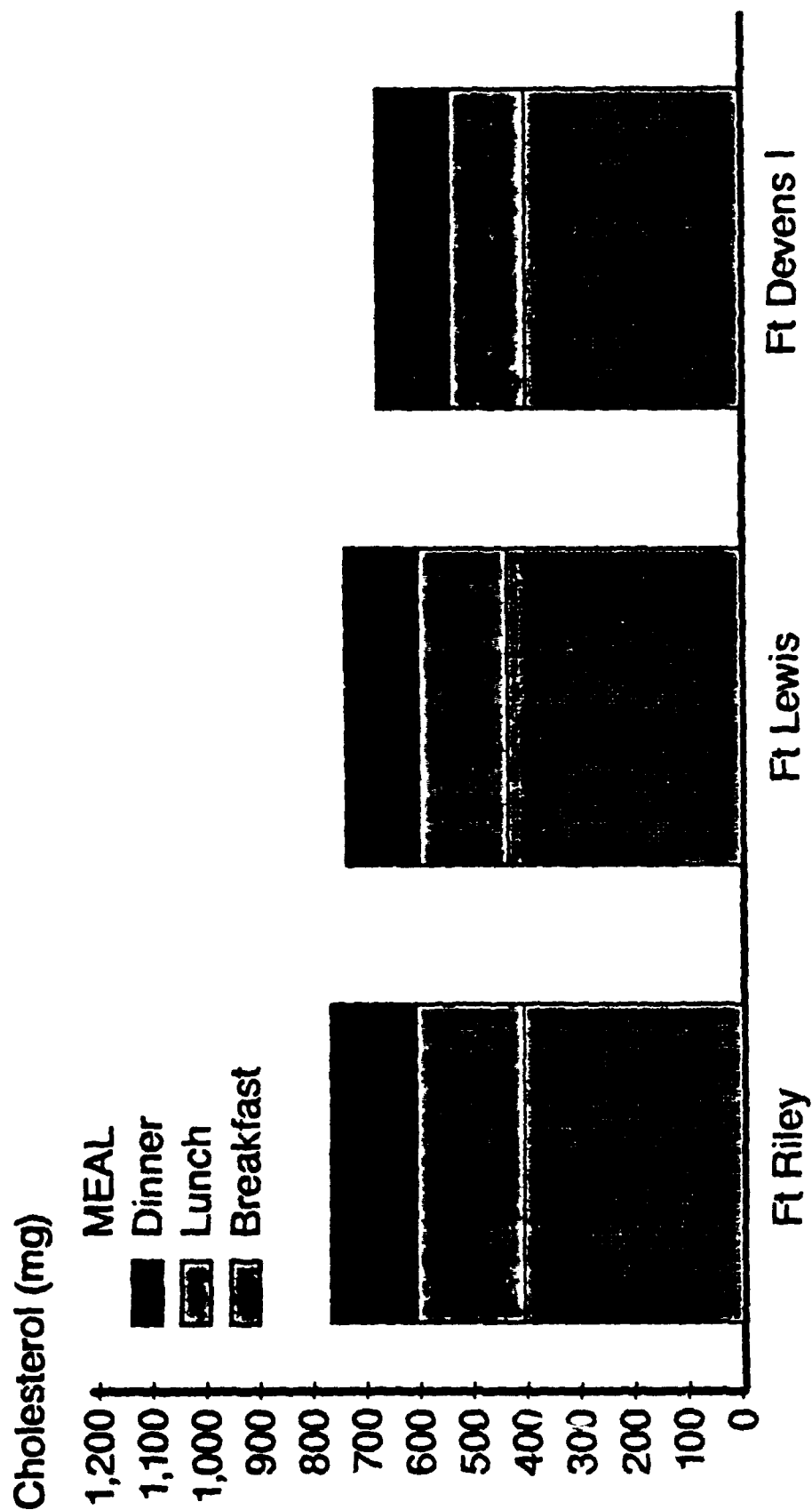


FIGURE 7

Comparison of Average Breakfast Cholesterol Intakes

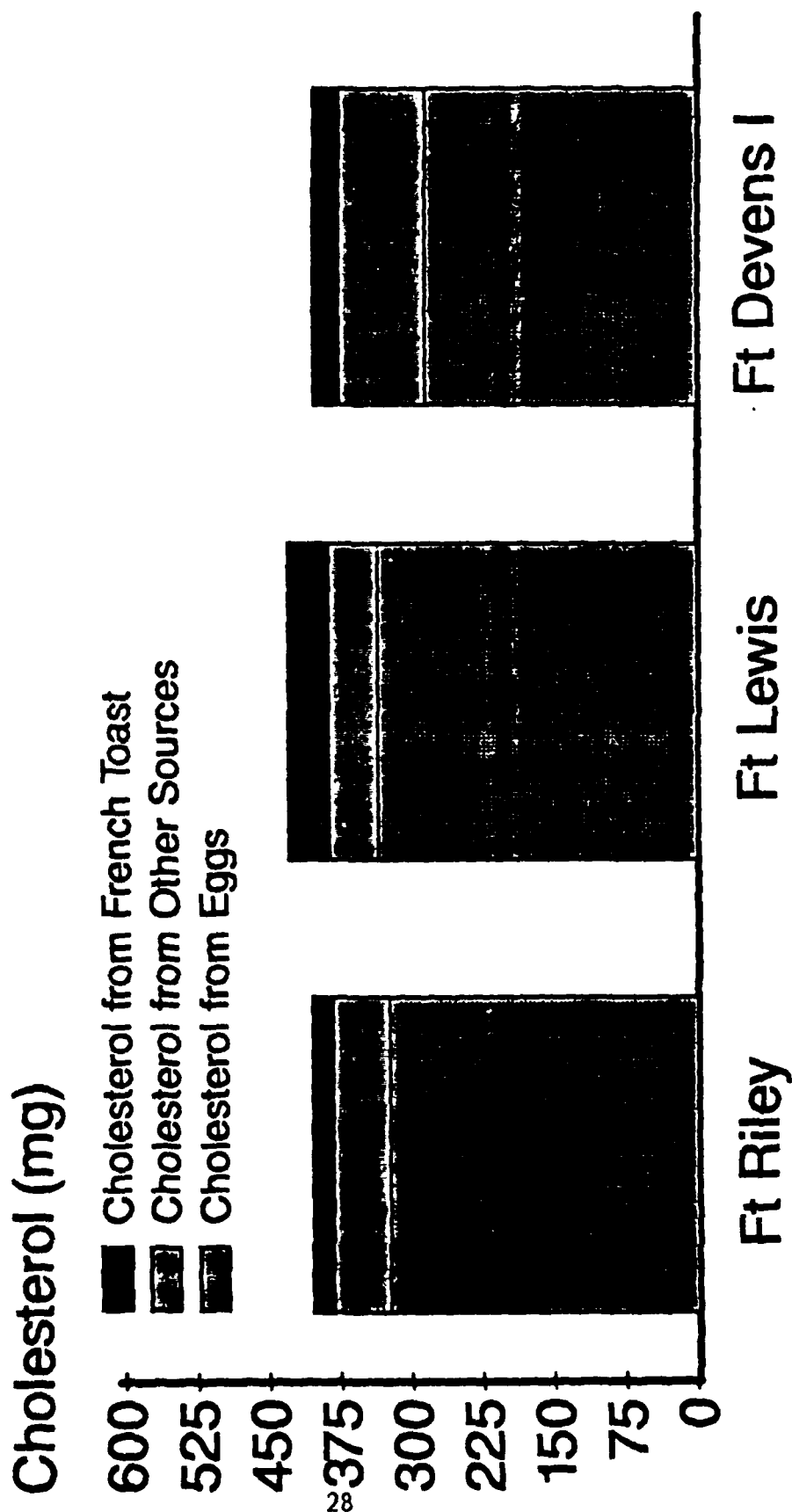


FIGURE 8

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APPENDIX A

A copy of the menu served on each day of the Ft. Devens study is provided in this appendix.

The breakfast menu consisted of a variety of foods which were available on a daily basis as listed:

French Toast	Assorted Fruit Juice
Pancakes	Assorted Fresh Fruit
Hot Cereal	Assorted Dry Cereals
Oven Fried Bacon	Fresh Hot Toast
Baked Sausage Patties	Hot Maple Syrup
Creamed Ground Beef	Peanut butter
Home Fried Potato	Ketchup
Fried Eggs	Skim Milk
Scrambled Eggs	Fresh Brewed Coffee
Hard Cooked Eggs	Tea/Lemon Wedges
Omelets to Order	Assorted Condiments
Biscuits	Hot Melted butter
Cheese Biscuits	Apple butter
Baking Powder Biscuits	Butter patties
	Assorted Yogurt
	Cream Substitute
	Hot Chocolate
	Assorted Jams & Jellies
	2% Lowfat Milk
	Lowfat Chocolate Milk

Assorted breakfast pastries were attractively displayed in a revolving mirrored and chilled pastry case as follows: glazed, frosted and or filled donuts, bear claws, coffee cake, Swedish tea rings, kolaches and frosted longjohns.

A plentiful variety of fresh fruits in season were served daily on the salad bar along with cold cereals and condiments. The assortment of fresh fruits included: bananas, cantaloupes, honeydew, grapefruit halves, pears, apples and oranges.

FT DEVENS

Lunch and dinner menus included short order which offered the following items daily: assorted grilled and cold sandwiches including submarine sandwiches, assorted pizzas, fried chicken, chili con carne, ravioli, baked beans, french fries, onion rings, potato chips, salad, soup, fresh fruit, assorted breads, soft serve ice cream, and beverage items. The menus are as follows:

Short Order

Grilled Hamburgers
Grilled Cheeseburgers
Grilled Frankfurters
Hamburger & Frankfurter Buns
Assorted Pizzas
Ravioli
Chili con Carne
Fried Chicken
Grilled Knockwurst
French Fries
Potato Chips

Sandwiches

Egg Salad
Tuna Salad
Ham and Cheese
Grilled Cheese
Sloppy Joe Sandwiches
Grilled Bologna & Cheese
Bacon Lettuce Tomato
Soup du Jour

Beverages

2% Fat Milk
Skim Milk
Chocolate Milk (2%)
Coffee
Tea
Fruit flavored drink mix
Carbonated Beverages

Salad Bar

Cucumber Slices
Cherry Tomatoes
Block Cheddar Cheese
Flavored Gelatin
Grated Cheese
Cottage Cheese
Macaroni Salad
Potato Salad
Cranberry Sauce
Carrot Sticks
Celery Sticks
Sliced Mushrooms
Chopped Hard Cooked Egg
Cucumber & Onion Salad
Green Pepper
Quartered Tomatoes
Cole Slaw
Black Olives
Green Olives
Sliced Onions
Sliced Pickles
Chopped Lettuce Leaves
Apple Sauce
Chopped Onions
Tabasco Sauce
Mayonnaise
Mustard
Catsup
Worcestershire Sauce
Saltine Crackers
Jalepeno Peppers
Bean Sprouts
Sliced Radishes
Green Onions
Assorted Salad Dressing
Assorted Diet Salad Dressing

FT DEVENS

19 August 1987 (Day 1)

Lunch

Beef Noodle Soup
Syrian Beef Stew
Braised Pork Chops
Baked Pork Chops
Roast Beef
Brown Gravy
Steamed Rice
Rissolle Potato
Seasoned Lima Beans
Stewed Tomato
Boston Cream Pie
Dutch Apple Pie
Chocolate Chip Cookies
Blueberry Pie

Dinner

Beef Noodle Soup
Stuffed Green Peppers
Savory Baked Chicken
Baked Pork Chops
Chicken Gravy
Mashed Potato
Oven Brownd Potato
Steamed Rice
Seasoned Mixed Vegetables
Seasoned Broccoli
Stewed Tomato
Boston Cream Pie
Dutch Apple Pie
Chocolate Chip Cookies
Blueberry Pie

20 August 1987 (Day 2)

Lunch

Onion Soup
Swedish Meatballs
Pork Chop Suey
Brown Gravy
Stuffed Green Peppers
Savory Baked Chicken
Steamed Rice
Noodles Jefferson
Seasoned Brussels Sprouts
Mixed Vegetables
Mexican Corn
Chocolate Cream Pie
Apple Brownies
Oatmeal Cookies

Dinner

Onion Soup
Oven Fried Chicken
Baked Chicken
Swiss Steak
Baked Ham Steaks
Brown Gravy
Swedish Meatballs
Pork Chop Suey
Mashed Potato
Steamed Rice
Mexican Corn
Sundaes with Asst. Toppings
Chocolate Cream Pie
Apple Brownies
Oatmeal Cookies

FT DEVENS

21 August 1987 (Day 3)

Lunch

Chicken Rice Soup
Turkey a la King
Breaded Veal Steaks
Braised Liver & Onions
Brown Gravy
O'Brien Potato
Rice Pilaf
Steamed Rice
Seasoned Cabbage
Lyonnais Wax Beans
Louisiana Style Squash
Lemon Pie
Chocolate Cookies
French Apple Pie
Yellow Cake w/ Chocolate Icing
Chocolate Cream Pie

Dinner

Chicken Rice Soup
Meatloaf
Beef Stew
Fried Fish
Baked Fish
Brown Gravy
Turkey a la King
Parsley Seasoned Potato
Seasoned Peas
O'Brien Potato
Cauliflower Combo
Seasoned Cabbage
Yellow Cake w/ Choc Icing
French Apple Pie
Chocolate Cream Pie
Lemon Pie
Chocolate Cookies

24 August 1987 (Day 4)

Lunch

Beef Noodle Soup
Ginger Pot Roast
Baked Tuna & Noodles
Breaded Veal Patties
Brown Gravy
Paprika Seasoned Potato
Glazed Carrots
Seasoned Lima Beans
Apple Pie
Peach Pie
White Cake w/ Vanilla Fr
Chocolate Brownies

Dinner

Beef Noodle Soup
Sweet & Sour Pork
Roast Turkey
Baked Tuna & Noodles
Chicken Gravy
Steamed Rice
Seasoned Mashed Potato
Seasoned Greens
Seasoned Peas
Apple Pie
Peach Pie
White Cake w/ Vanilla Fr
Chocolate Brownies

FT DEVENS

25 August 1987 (Day 5)

Lunch

Beef Rice Soup
Spaghetti w/ Meat Sauce
Syrup Glazed Cornish Hens
Chicken Gravy
Parsley Seasoned Potato
Seasoned Broccoli
Seasoned Mixed Vegetables
Chocolate Cream Pie
Fruit Shortcake
Cherry Pie
Coconut Drop Cookies

Dinner

Beef Rice Soup
Roast Beef
Fried Fish Portions
Baked Fish Portions
Spaghetti w/ Meat Sauce
Syrup Glazed Cornish Hens
Brown Gravy
Oven Browned Potato
Seasoned Mashed Potato
Parsley Seasoned Potato
Seasoned Green Beans
Paprika Seasoned Cauliflower
Chocolate Cream Pie
Cherry Pie
Coconut Drop Cookies
Fruit Shortcake

26 August 1987 (Day 6)

Lunch

Beef Noodle Soup
Chicken Cacciatore
Roast Veal
Baked Chicken
Breaded Veal Patties
Brown Gravy
Seasoned Mashed Potato
Seasoned Potato
Parsley Seasoned Carrots
Seasoned Peas
Boston Cream Pie
Dutch Apple Pie
Chocolate Chip Cookies
Blueberry Pie

Dinner

Beef Noodle Soup
Stuffed Cabbage Rolls
Braised Beef & Noodles
Chicken Cacciatore
Brown Gravy
Steamed Rice
Seasoned Potato
Stewed Tomato
Parsley Seasoned Carrots
Seasoned Peas
Seasoned Squash
Boston Cream Pie
Dutch Apple Pie
Chocolate Chip Cookies
Blueberry Pie

FT DEVENS

27 August 1987 (Day 7)

Lunch

Chicken Rice Soup
Salisbury Steak
Fried Fish
Baked Fish
Stuffed Cabbage Rolls
Braised Beef & Noodles
Rissolle Potato
Seasoned Mashed Potato
Steamed Rice
Seasoned Cabbage
Seasoned Mixed Vegetables
Stewed Tomato
Cheese Cake w/ Blueberry Topping
Chocolate Cream Pie
Apple Brownies
Oatmeal Cookies

Dinner

Chicken Rice Soup
Grilled Ham Steaks
Chili Macaroni
Beef Pot Pie
Brown Gravy
Paprika Seasoned Potato
Broccoli Polonaise
Seasoned Succotash
Cheese Cake w/ Blueberry Topping
Chocolate Cream Pie
Apple Brownies
Oatmeal Cookies

DEPARTMENT OF THE ARMY
HEADQUARTERS FORT DEVENS
Fort Devens, Massachusetts 01433-5000
20 February 1987

APPENDIX B

Food Program GARRISON DINING FACILITIES NUTRITION PROGRAM

SUMMARY. This pamphlet establishes nutritional guidelines to be utilized in the Installation Food Service Program. It is designed to educate the soldiers and food service personnel on nutritional standards.

APPLICABILITY. This pamphlet applies to all Fort Devens Active Army units and activities.

IMPACT ON THE NEW MANNING SYSTEM. This pamphlet does not contain information that affects the New Manning System.

SUPPLEMENTATION. Local supplementation of this pamphlet is prohibited, except upon approval of the Director of Logistics. Requests for exception, with justification, will be sent to Commander, Headquarters Fort Devens, ATTN: AFZD-DLS, Fort Devens, MA 01433-5330.

SUGGESTED IMPROVEMENTS. The proponent of this pamphlet is the Director of Logistics. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, Headquarters Fort Devens, ATTN: AFZD-DLS, Fort Devens, MA 01433-5330.

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*Supersedes para 7-3, PD Pam 30-1, 1 Jul 86

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CHAPTER 1

GENERAL

1-1. This pamphlet describes a Nutritional Program within dining facilities at Fort Devens and establishes a nutrition committee consisting of subordinate command, Medical Department Activity (MEDDAC), and food service representatives. The program specifies policies for food preparation and daily servings of food from the basic four food groups. It establishes a low calorie meal requirement for each dining facility and standardizes nutrition policy throughout Fort Devens dining facilities. This is vital for success.

a. The leadership must focus on nutrition awareness and education. If the audience is aware of the part nutrition plays in good health and has the proper foundation to make wise choices, healthy eating habits will become second nature. That is the ultimate goal of this program.

b. Finally, it must be emphasized that a nutrition program is not calorie counting. It must provide healthy, nutritious, and palatable meals to a wide audience with a variety of needs.

1-2 Purpose.

- a. Educate Fort Devens personnel about healthy eating.
- b. Develop nutrition awareness.
- c. Instill a desire to eat smart.
- d. Provide specific guidance to food service personnel and commanders.

1-3. References. The following references should be maintained by dining facility managers:

- a. AR 30-1, The Army Food Service Program.
- b. AR 40-25, Nutrition Allowances, Standards, and Education.
- c. FM 10-23, Preparation and Serving of Food in the Garrison Dining Facility.
- d. SB 10-260, Master Menu.
- e. SB 10-264, Calorie Listing of Master Menu Recipes and Food Items.
- f. TM 10-412, Armed Forces Recipe Service.

CHAPTER 2

RESPONSIBILITIES

2-1 Commanders/Contractors Operating Dining Facilities. Commanders/contractors operating dining facilities will:

- a. Ensure that a diet of sufficient variety, nutritional value, and attractiveness is provided at each meal. Helpful hints are provided throughout this publication.
- b. Ensure new arrivals and permanent party receive a nutrition orientation. A commander's briefing is at appendix A.
- c. Ensure that unit dining facility evaluations include a check on nutrition and include comments on nutritional performance as outlined in appendix J, AR 30-1.
- d. Ensure that policies outlined in this pamphlet are followed in all dining facilities operated on Fort Devens.

2-2 Commander, MEDDAC. The Commander, MEDDAC, will:

- a. Provide advice and assistance, on request, to commanders, directors, and other interested parties on menus, diets, and medically related nutritional questions.
- b. Provide formal nutritional training upon request.
- c. Provide samples of nutritional education materials to be used in dining facilities.
- d. Provide representation on the Dining Facility Nutrition Committee. The membership is outlined in chapter 4-3.

2-3 Director of Logistics (DOL). The DOL will:

- a. Act as the primary staff agency responsible for the Fort Devens Nutrition Program.
- b. Form an Installation Nutrition Committee and appoint a chairperson. The committee will formulate guidance, oversee program implementation, evaluate suggestions from the Fort Devens community, and interact with the Installation Menu Board.
- c. Ensure that the monthly menu board addresses nutritional topics to provide a balanced, healthy menu to all dining facilities.
- d. Conduct scheduled food service evaluations and assistance visits to ensure compliance with, and assistance in, the Fort Devens Nutrition Program.
- e. Ensure that standard nutrition educational materials are available to each dining facility.
- f. Ensure that the Installation Food Adviser conducts and monitors a nutritional program for all food service personnel.
- g. Support and promote nutritional initiatives applicable to the resale commissary system.

2-4 Director of Personnel and Community Activities (DPCA). Support and promote nutritional initiatives applicable to the nonappropriated fund system (clubs, Post Exchange food operations, etc.)

2-5 Public Affairs Officer (PAO). The PAO will provide assistance through publicity for the Nutrition Program.

CHAPTER 3

DINING FACILITY NUTRITION COMMITTEE

3-1 General. The Dining Facility Nutrition Program is based on the elements of awareness, variety, and choice. It is not the intent of the program to force personnel to eat food items that others feel are healthy. It is the intent of the program to provide each dining facility patron the facts needed to make item choices and to make those choices available on serving lines in a desirable state of preparation. The ultimate objective is to make each individual desire healthy foods as a normal way of life.

3-2 Policies and Guidelines. The program establishes guidelines and policies that standardize implementation of the Nutrition Program. Specific policies and guidelines are stated in this chapter and in the chapters dealing with specific food groups.

4-6. Minerals occur in small but vital amounts. They aid in blood coagulation and serve as a catalyst for vitamins. A well balanced diet also eliminates the need for mineral supplements.

4-7. Water is also a nutrient. It is essential to good health and aids in maintaining the body temperature, in eliminating waste material, and in maintaining the proper metabolism.

CHAPTER 5

BASIC FOOD GROUPS

5-1 General. When planning dining facility menus, a variety of foods must be offered to meet nutritional requirements. The basis for selecting the proper choices to offer is the four basic food groups. Servings of each of these foods daily provides diners with the required daily nutrients.

5-2 Basic four food groups are:

a. Fruit and Vegetable Group. This group provides Vitamins A and C, other nutrients and fibers. Dark green and yellow vegetables provide Vitamins A and C. Citrus fruits, melons, berries, and tomatoes provide Vitamin C. Unpeeled fruits and vegetables provide fiber.

b. Grain Group. The grain group is a source of thiamine, protein, iron, niacin, carbohydrate and fiber. Enrichment of breads and cereals substantially contribute additional amounts of these nutrients to the diet. Whole grain cereals, breads and starches are important sources of fiber.

c. Milk Group. These foods are major sources of calcium and certain vitamins. This food group includes all milks, ice milk, buttermilk, yogurts, cheese, and cottage cheese.

d. Meat Group. These foods supply iron, protein, certain vitamins, and phosphorus. Foods in this group include: Beef, veal, pork, lamb, poultry, fish, shellfish, eggs, dried beans, and peas, soybeans, lentils, seeds, nuts, peanuts, and peanut butter.

5-3 Other Foods. Foods which do not fit into the basic four groups include: fats, sweets, and alcohol. They are low in nutrients and high in calories. They add very little to the nutrient value of a meal. Foods in this other group include: sweet desserts, candy, sugar, jams, syrups, soft drinks, gravies, sauces, butter, wine, beer, and other alcoholic beverages.

5-4 Policies.

a. Fruit and Vegetable Group:

(1) Each dining facility will have a fresh fruit and salad bar at the lunch and dinner meals. Fresh fruit should also be available at the breakfast meal.

(2) Each patron will be offered a minimum daily serving of four fruit/vegetable servings. One serving of citrus fruits (oranges, grapefruits, etc.) and one serving of dark, leafy green or deep yellow vegetables should be included daily. Serving sizes are contained in the standard Army recipes.

(3) Vegetables should be prepared using the standard Army recipes minus butter or margarine. Melted margarine for seasoning should be available to patrons upon request. Cooking times will be followed.

b. Grain Group:

(1) Patrons will be offered a minimum of four servings daily from this food group.

(2) Presweetened cereals will be kept to an absolute minimum. Procurement of presweetened cereals by TISA will be limited.

(3) Dining facilities will vendor order whole grain breads (wheat, rye, and rolls, etc.) to be offered with white bread products.

(4) Pancakes, waffles, and other baked goods should be prepared using an unsaturated fat rather than solid shortening. Fruit toppings should be offered as well as syrups.

c. Milk Group:

(1) Dining facility patrons will be offered a minimum of three servings daily from this food group.

(2) The TISA will procure, and dining facilities will offer, 2% low fat milk as the primary milk. Skim milk and whole milk will be ordered from the vendor in 1/2 pint containers and offered at each meal.

(3) Standard Army recipes calling for milk will be prepared using nonfat dry milk.

(4) Grated cheese and cottage cheese will be offered daily on salad bar.

(5) Block surplus cheese will be available on the salad bar for all lunch and dinner meals.

(6) Yogurt will be available if there is sufficient demand.

d. Meat Group:

(1) Patrons will be offered a minimum of two servings daily of this food group at the lunch and dinner meals. Each meal will contain a choice of two meats (red meat, poultry, or fish).

(2) Fried meat entrees will be kept to a minimum and will not exceed the number of times recommended by the master menu.

(3) When preparing fried meats, an unsaturated frying medium should be used.

(4) When serving fried poultry or fish products, a non-fried portion of the same item will be offered.

(5) Before preparing meat products, excess fat will be trimmed to reduce fat content.

(6) Before serving finished meat products, excess oils and fats will be drained.

CHAPTER 6

CALORIES/WEIGHT LOSS DIETS

6-1 General. Calories and weight loss diets do not constitute a total nutrition program. Merely providing diners a low calorie menu does not meet the nutritional requirements of this pamphlet. Soldiers undergoing basic training and active permanent party personnel require a diet that gives them between 2500-4000 calories per day. Soldiers performing less active training will probably require a diet of 1800-2000 calories per day to maintain good health and ideal body weight. Low calorie weight loss diets should only be prescribed by a competent medical authority. Individuals who wish to limit their caloric intake should still make sure that they include, on a daily basis, a variety of foods from the various food groups in the Nutrition Program.

6-2 Policies. Since all dining facilities on Fort Devens have a variety of patrons, an attempt must be made to meet all requirements.

a. When planning daily menus, the following food item alternatives will be provided for each meal in addition to those already stated in this program: low calorie salad dressings, low calorie beverages (carbonated and non-carbonated), sugar substitute, and margarine patties.

*Not specific to a low calorie diet; however, are recommended for good health.

b. Calories of food items served at each meal will be posted prior to entering the serving area. Use SB 10-264 for this purpose.

CHAPTER 7

USE OF SALT

7-1 General. The subject of salt is a highly controversial subject. Salt is a tasty addition to food and a valuable nutrient. Too much salt, however, can be dangerous. There is medical evidence that too much salt contributes to high blood pressure leading to heart disease and strokes. It is a fact that the average American diet contains more salt than is required by the body.

7-2 Policies.

- a. The standard Army recipes will be followed and all salt will be reduced by 1/4 unless the quality of the finished product is affected.
- b. An herbal seasoning mixture will be offered in addition to regular salt. Recommended and approved recipes are at appendix C.

CHAPTER 8

NUTRIENT RETENTION IN FOOD PREPARATION AND SERVICE

8-1 General. Food items, on their way to the dining facility, can lose nutrients due to improper handling or storage practices. Once these food items arrive at the dining facility, it is the food preparation and service practices that could contribute to even more nutrient losses. As dining facility personnel, you cannot do much to influence the nutrient retention of food items before they arrive in your facility, except to refuse those food items that are obviously poor in quality. You can, however, have direct influence over nutrient losses occurring during food processing in your dining facility. The nutrients most frequently lost due to improper preparation and service are the B complex Vitamins and Vitamin C. Exposure to air (oxygen) and contact with hot water during heating or steaming are conditions which promote nutrient losses from food items. While it is true that no food item can be cooked or held under heat or refrigeration without some sacrifice in vitamin content, there are methods of preparation, cooking, and holding food items that can lessen nutrient losses. The following suggestions should help to prevent any significant nutrient losses in food items served in your dining facility.

8-2 Storage:

- a. Store at recommended temperatures.
- b. Allow necessary air circulation to maintain recommended storage temperatures.
- c. Provide cool, dry, ventilated conditions.
- d. Except for bread, practice the "first-in, first-out" method of food storage.

8-3 Preparation:

- a. Avoid early preparation of cooked foods.
- b. Utilize the progressive cooking method whenever possible.
- c. Avoid using high cooking temperatures when lower temperatures are adequate.
- d. Avoid too much cooking water -- STEAM WITHOUT WATER WHEN POSSIBLE.
- e. Do not thaw frozen vegetables before cooking (with the exception of corn on the cob).
- f. Avoid excessive cutting/chopping of fruits and vegetables.
- g. Do not add baking soda to vegetables during the cooking process.
- h. Utilize vegetable stocks for the preparation of other foods.
- i. Cook for as short a time as possible.

8-4 Services:

- a. Minimize the amount of time a food item is on the serving line.
- b. Regulate the temperatures of the steam table for proper holding temperatures of the food items -- DO NOT BOIL THE FOOD ITEMS.
- c. Avoid excessive stirring or handling of the food items on the serving line to minimize exposure of the food items to the air.
- d. Cover food items prior to serving of the meal and during slow meal periods.

APPENDIX A

COMMANDERS BRIEFING ON NUTRITION

What is nutrition? Nutrition is what you eat and how your body uses it. It is your total daily food intake transformed into physical appearance, energy, growth, and countless other body functions.

Let's discuss some of the outward signs of good nutrition:

- a. Body: Well developed.
- b. Weight: Correct for height and age.
- c. Muscles: Well developed and firm.
- d. Skin: Smooth and clear and slightly moist.
- e. Hair: Smooth and glossy.
- f. Eyes: Clear and without dark circles around them.
- g. Facial Expression: Alert without strain.
- h. Posture: Good, i.e., head erect, chest up, shoulders flat, abdomen in.
- i. Attitude: Good natured, full of life, buoyant.
- j. Sleep: Sound.
- k. Appetite: Good.
- l. Digestion and Elimination: Good.
- m. Appearance: Of general well being.

These will vary from individual to individual, but nutrition plays an important role in each of these areas.

Why should you worry about nutrition? People are not aware of the inter-relationship between dietary factors and chronic diseases. There are seven items that can be used to improve your nutritional intake.

1. Eat a variety of foods. No single food item supplies all the essential nutrients; the greater the variety the less likely you are of developing either a deficiency or excess of any single nutrient. To ensure an adequate diet, a variety of foods, including whole grains, enriched cereals and breads, fruits and vegetables, meat, poultry, eggs and fish, dry peas, beans, and dairy products are needed.

Application: Use the basic four food group guidelines to select your meals as shown by posters that you will routinely see displayed in your dining facility.

2. Moderate intake of calories. To maintain your ideal body weight, you should only consume as much energy as you expend. If overweight, calories should be reduced by decreasing the total food intake, especially fats, oils, sugars, and alcohol. In addition, you should increase your physical activity.

Application: Check the calorie posting of foods offered for each meal when you enter the dining facility.

3. Avoid excessive dietary fat intake. Because of their high calorie content, consumption of fats and oils should be limited during weight reduction and weight maintenance. Personnel can reduce their risk for heart disease by reducing saturated fats and dietary cholesterol. Reduce the number of eggs each week, avoid gravies and the addition of butter and animal fats to vegetables.

Application: Sauces, gravies, and butter/margarine will be served separately from meat food items and must be requested.

4. Eat foods with adequate starch and fiber. Complex carbohydrates should be increased to supplement calorie deficit due to reduction of fat and refined sugar calories. Emphasis should be placed on fiber rich foods; such as whole grain products, vegetables (especially raw vegetables), and mature legumes (dried beans, peas).

Application: Wheat, rye, and raisin breads/rolls are offered at meals in addition to the regular white bread/rolls. Fresh fruits and salads are also routinely available.

5. Moderate intake of refined and other processed sugars. Our major health problem from frequent consumption of sugar is dental cavities. Excessive intake of refined sugars may displace other foods which are important sources of essential nutrients. Reducing sugar also reduces calories for those who must watch their weight.

Application: Sugar substitute is available in all dining facilities. Presweetened cereals are limited and desserts include more variety of less sweet items. Fruit topping for pancakes, waffles, and french toast is also available.

6. Moderate intake of salt. Under normal conditions, an adequate but safe intake is considered to range between three and four grams of salt daily. The average American consumes twice the amount of salt needed. Since salt is added to foods during the cooking process, try to avoid adding it at the table. Excessive amounts of salt are dangerous for those who are at risk for high blood pressure.

Application: The facilities offer a variety of seasoning mixtures, in addition to the salt on tables.

7. Exercise moderation in alcohol consumption. Alcoholic beverages are of low nutrient density and high in calories. They can displace valuable nutrient-rich foods needed in the diet.

Application: Under routine conditions, alcohol is not permitted in the dining facilities.

This pamphlet is not advocating calorie reduction; it is stressing nutrition awareness. The dining facilities are using various education materials to make the soldier more aware of what he/she eats. Nutrition posters will be displayed in various locations in the facility, together with posters concerning the Army weight control program.

In closing, you should know that the Army is aware of how important nutrition is to the soldier. Every effort must be made to improve the eating habits and nutritional awareness of the soldier. Remember - "you are what you eat" and "we will get fit to fight, and will fight to stay fit."

APPENDIX B

HERBAL REPLACEMENTS FOR SALT

1. The following herbal recipes are suggested seasonings that may be used instead of salt. Suggested uses for each recipe are given.
2. There are two amounts listed for each ingredient. The amount on the left is for a single shaker; the amount on the right is for bulk preparation.
3. Recipe abbreviations are as follows:

Tsp = Teaspoon C = Cup
Tbs = Tablespoon QT = Quart

4. Recipe Conversion Chart:

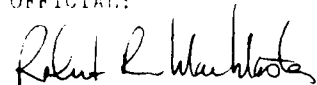
Tsp	Tbs	Cups	Quarts
3	1		
	2	1/8	
	4	1/4	
	5	1/3	
	8	1/2	
48	16		1/4
	64	4	1

5. All-purpose table seasonings (can also be used for a variety of food items during preparation; listed in order of acceptability):

PER SHAKER	INGREDIENT	BULK
Recipe #1		
5 Tbs	Instant Minced Onion	8 QT
1 Tsp	Sweet Basil	2 C
1 Tsp	Black Pepper	2 C
1 Tsp	Ground Cumin	2 C
2 Tsp	Garlic Powder	4 C
3 Tsp	Sesame Seed	6-1/4 C
Recipe #2		
1 Tsp	Chili Powder	2 C
1 Tsp	Garlic Powder	2 C
2 Tbs	Dry Mustard	12-1/2 C
6 Tbs	Onion Powder	9-1/3 Qt
2 Tsp	Oregano	4 C
3 Tsp	Paprika	6-1/4 C
2 Tsp	Pepper (red or black)	4 C
Recipe #3		
2-1/4 Tbs	White Pepper	3-1/2 Qt
1-1/2 Tsp	Grated Nutmeg	3 C and 2 Tbs
1-1/2 Tsp	Ground Ginger	2-1/3 C
1/2 Tsp	Ground Cloves	1 C and 3 Tbs
Recipe #4 (very spicy/hot)		
1 Tsp	Onion Powder	2 C
1 Tsp	Paprika	2 C
1 Tsp	Dry Mustard	2 C
1 Tsp	Garlic Powder	2 C
1/4 Tsp 1/2	Cayenne Pepper	1/2 C

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Demographic Questionnaire

APPENDIX C

Name _____

SSN _____

Subject Number _____

Sex M F

Age _____

Race _____

1-White

2-Black

3-Hispanic

4-Other _____

Length of Time in Military _____ years

Rank _____

MOS

Primary _____

Secondary _____

Duty _____

Marital Status

1-Single

2-Married

3-Separated

4-Divorced

5-Widow/Widower

Highest Level of Civilian Education Completed

1 Grade School 3 College, Undergraduate

2 High School 4 Graduate School 5 Other(Specify) _____

Do you smoke or chew tobacco? Yes No

Number of cigarettes smoked per day _____

Number of cigars smoked per day _____

Number of pipes smoked per day _____

Number of tobacco chews per day _____

How long have you been smoking/chewing? _____

Demographic Questionnaire

During a typical week, which meals do you eat, regardless of where you eat them? (Please check meals you eat).

	M	T	W	TH	F	SAT	SUN
Breakfast							
Lunch							
Dinner							

During a typical week, which meals do you eat at a military dining facility? (Please check those eaten in a military dining facility).

	M	T	W	TH	F	SAT	SUN
Breakfast							
Lunch							
Dinner							

How often during the week do you eat snacks? _____ Times

Between breakfast & lunch _____ times

Between lunch & dinner _____ times

After dinner _____ times

Please indicate any dietary supplements you take regularly. Specify brand and amount.

Protein _____

Vitamins _____

Minerals _____

Other _____

Are you satisfied with your current weight? Yes No

Are you trying to lose weight? Yes No How Much?

Are you trying to gain weight? Yes No How Much?

Do you follow any special diet? Yes No

If yes, please specify type _____

Do you add salt to your food? Yes No

Do you use a herb shaker? Yes No

APPENDIX D
RATION RECORD

BREAKFAST/LUNCH/DINNER

NAME: _____

DATE: _____

SUBJECT #: _____

DATA COLLECTOR #: _____

MEAL: (CIRCLE ONE)

BREAKFAST -- B

LUNCH -- L

DINNER -- D

[illegible]

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